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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,355	11/17/2003	Munchiro Tabata	040356-0496	9164

22428 7590 03/08/2005

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EXAMINER

NGUYEN, TU MINH

ART UNIT PAPER NUMBER

3748

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/713,355

Applicant(s)

TABATA ET AL.

Examiner

Tu M. Nguyen

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Amendment filed on February 1, 2005 has been entered. Overall, claims 1-13 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, and 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (European Patent Application EP 1,174,600 A2) in view of Hirota et al. (U.S. Patent 5,974,791).

Re claims 1, 12, and 13, as shown in Figures 1 and 4-7, Kobayashi et al. disclose a purification device for an exhaust gas of a diesel engine and a method for controlling said purification device, the device comprising:

- a catalyst (17) which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, the sulfur oxides poisoning the catalyst being eliminated by contact with an exhaust gas corresponding to a rich air-fuel ratio;

- a filter (18) which traps particulate matter in the exhaust gas and burns a trapped particulate matter by contact with an exhaust gas corresponding to a lean air-fuel ratio;
- an air-fuel ratio regulating mechanism (8, 9, 10) which varies an exhaust gas composition of the engine between a composition corresponding to the lean air-fuel ratio and a composition corresponding to the rich air-fuel ratio;
- a sensor (120, 130) which detects a particulate matter trap amount of the filter; and
- a programmable controller (9) programmed to:
 - control the air-fuel ratio regulating mechanism to cause the exhaust gas composition of the engine to be in a state corresponding to the rich air-fuel ratio (step S401 with YES answer, step S405 with YES answer, and step S407);
 - determine whether or not the particulate matter trap amount has reached a predetermined amount while the exhaust gas composition is in a state corresponding to the rich air-fuel ratio (step S402 and Figure 5);
 - control the mechanism to cause the exhaust gas composition to be in a state corresponding to a high temperature (step S406), when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio (step S405 with NO answer and step S406);
 - determine whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to a high temperature (step S405); and

- control the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to a high temperature (step S405 with YES answer and step S407).

Kobayashi et al., however, fail to disclose that the during the regeneration of the filter in step S406, the exhaust gas composition is in a state corresponding to a lean air-fuel ratio.

As shown in Figures 1-2, Hirota et al. teach an exhaust gas purification device comprising a DPF (10a) that is adapted to trap particulate matter, NO_x, and SO_x in the exhaust gas. Hirota et al. further teach that when it is time to purge particulate matter from the DPF (step 213 with YES answer), a lean exhaust gas composition at the DPF is required (step 215). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching taught by Hirota et al. in the device of Kobayashi et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art.

Re claim 2, in the purification device of Kobayashi et al., the sensor comprises a sensor (120, 130) which detects a differential pressure between an inlet and an outlet of the filter.

Re claim 5, in the purification device of Kobayashi et al., the air-fuel ratio regulating mechanism comprises an intake throttle (8) which regulates an intake air amount of the engine.

Re claim 6, in the purification device of Kobayashi et al., the air -fuel ratio regulating mechanism comprises a fuel injector (10) which injects fuel into the exhaust gas of the engine.

Re claim 7, in the purification device of Kobayashi et al., the engine comprises an exhaust gas recirculation passage (23) which recirculates part of the exhaust gas into an intake

air according to an exhaust gas pressure of the engine, and the air-fuel ratio regulating mechanism comprises an exhaust throttle (25) which regulates the exhaust gas pressure.

Re claim 8, in the purification device of Kobayashi et al., the engine comprises a fuel injector (19) which supplies fuel for combustion, and the air-fuel ratio regulating mechanism comprises the fuel injector set to perform a post-injection after fuel is supplied for combustion.

Re claims 9-10, in the purification device of Kobayashi et al., the controller is further programmed to determine that, when the exhaust gas composition of the engine has continued to be in the state corresponding to the lean air-fuel ratio for a predetermined time, the particulate matter trap amount has reached the predetermined decrease state (steps S405-S406), wherein the predetermined amount corresponds to a state where the particulate matter trap amount is saturated, and the predetermined decrease state corresponds to a state where the particulate matter trap amount is zero.

Re claim 11, in the purification device of Kobayashi et al., the predetermined decrease state corresponds to a differential pressure when the controller started to control the air-fuel ratio regulating mechanism for the first time to cause the exhaust gas composition of the engine to be in the state corresponding to the rich air-fuel ratio.

4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. in view of official notice as applied to claim 1 above, and further in view of legal precedent.

The purification device of Kobayashi et al. discloses the invention as cited above, however, fails to disclose that the state of the exhaust gas composition corresponding to the rich air-fuel ratio, corresponds to an exhaust gas produced by combustion of an air-fuel mixture

wherein an excess air factor is within the range 0.95 to 1.0; and that the state of the exhaust gas composition corresponding to the lean air-fuel ratio, corresponds to an exhaust gas produced by combustion of an air-fuel mixture wherein an excess air factor is within the range 1.05 to 1.1.

Kobayashi et al. disclose the claimed invention except for specifying an optimum range of excess air factor of 0.95 to 1.0 and 1.05 to 1.1 for the rich air-fuel ratio condition and the lean air-fuel ratio condition, respectively. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum range of excess air factor for each of the rich air-fuel ratio and the lean air-fuel ratio condition, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Response to Arguments

5. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

Applicant argues that Kobayashi et al. merely disclose performing SOx poisoning elimination of a NOx catalyst after regeneration of particulate matter has been completed; and that Kobayashi et al. do not disclose ceasing rich air-fuel ratio operation of the engine, such as when a SOx poisoning elimination operation is performed, when the trapped amount of particulate matter has reached a predetermined amount and then starting lean operations followed by resuming rich operation once the trapped amount falls to a decreased state (page 8 of Applicant's Amendment). As such, Applicant alleges that Kobayashi et al. fail to disclose the

steps of “controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the lean air-fuel ratio, when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio” and “controlling the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio”. The examiner respectfully disagrees with this allegation.

In paragraph 0119, Kobayashi et al. state that “*In the second embodiment, the recovery-process terminating means is activated to terminate or inhibit the process to recover the NO_x catalyst (17) from the S-poisoning when the particulate-amount detecting means determines that the amount of the accumulated particulate matters is larger than the predetermined threshold value. In this case, the particulate matters are removed by burning or oxidation, and then the S-poisoning recovery process is implemented by the S-poisoning recovery means,*” (emphasis added by examiner). This statement is further explained in Figures 4-5 and in paragraph 0101 where it states that “*step S505 is provided to determine whether a difference ($Pd - Pd'$) is greater than a predetermined threshold value. If this determination is affirmative, it is determined that the particulate filter (18) is deteriorated or defective. In this case, the process to recover the NO_x catalyst (17) from the S-poisoning is terminated.*” (emphasis added by examiner). Therefore, Kobayashi et al. clearly disclose or suggest the claimed features in dispute.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Communication

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

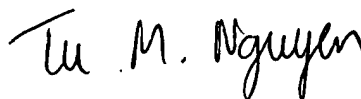
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 3748

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

March 6, 2005



Tu M. Nguyen

Primary Examiner

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